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01/14/2004

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| EXAMINER |
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GUERRERO, MARIA F

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| ART UNIT | PAPER NUMBER |
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2822

DATE MAILED: 01/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/054,697

Applicant(s)

WALITZKI ET AL.

Examiner

Maria Guerrero

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 September 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-14, 19 and 18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10, 19-18 is/are rejected.
- 7) ☒ Claim(s) 11-14 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
- a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. This Office Action is in response to the Amendment filed September 22, 2003.

Claims 15-17 and 20-23 are canceled.

Claims 1-14 and 18-19 are pending.

Claim Objections

2. Claims 11-14 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim.

Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claims 11-14 do not further limit the independent claim 1.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-3 and 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kub et al. (U.S. 6,328,796) in view of Chan et al. (U.S. 6,057,212).

Kub et al. teaches providing an initial multycrystalline substrate, polishing the multycrystalline substrate to reduce surface roughness to less than 10 nm (Abstract, col. 1, lines 1-25, col. 9, lines 5-15). Kub et al. shows forming a filler layer overlying the

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face of the substrate, polishing the surface of the filler layer to form a substantially smooth upper surface on the substrate (col. 9, lines 25-45). Kub et al. teaches the multycrystalline substrate being a ceramic handle substrate (col. 8, lines 35-68, col. 10, lines 15-30).

Kub et al. does not specifically show the surface roughness being 20 Angstroms or less, surface roughness being 5 Angstroms or less. However, Chan et al. shows polishing the surface in order to obtain a surface roughness of 5 Angstroms or less (col. 3, lines 55-65, col. 5, lines 10-15).

Since Kub et al. and Chan et al. are both from the same field of endeavor of preparing surface for bonding, the purpose disclosed by Chan et al. would have been recognized in the pertinent art of Kub et al.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Kub et al. by specifying the surface roughness as taught Chan et al. in order to enhanced bonding properties.

4. Claims 1, 7-8, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Enquist (U.S. 6,500,694) in view of Kub et al. (U.S. 6,328,796).

Enquist teaches polishing a substrate to obtain a smooth and planar surface, forming a filler layer overlying the face of the substrate, polishing the surface of the filler layer (SiO_2) to form a substantially smooth upper surface on the substrate, the surface roughness being between 5-10 Angstroms (col. 6, lines 35-55, col. 7, lines 10-35).

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Enquist does not specifically show the initial substrate being a multycrystalline substrate. However, Kub et al. shows employing the multycrystalline substrate (Abstract, col. 1, lines 20).

Since Enquist and Kub et al. are both from the same field of endeavor of preparing surface for bonding, the purpose disclosed by Kub et al. would have been recognized in the pertinent art of Enquist.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Enquist's process by using a multycrystalline substrate as taught Kub et al. in order to reduce cost.

5. Claims 4, 6, and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Enquist (U.S. 6,500,694) and Kub et al. (U.S. 6,328,796) as applied to claims 1, 7-8, 10 above, and further in view of Easter et al. (H1137).

Regarding claims 4, 6, and 9, the combination of Enquist and Kub et al. does not specifically show the film being polycrystalline silicon formed by low pressure CVD. However, Easter et al. using a polycrystalline silicon formed by low pressure CVD (col. 3, lines 20-33).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to specify the use polycrystalline silicon in the combination of Enquist and Kub et al. because Enquist suggested that silicon might also be used (col. 8, lines 10-15).

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6. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Krishna et al. (U.S. 5,571,373) in view of Chan et al. (U.S. 6,057,212).

Krishna et al. teaches applying a rough polishing step using alkaline slurry, changing the composition of the slurry by feeding neutral polishing slurry to the polishing pad and reducing the supply of the rough polishing slurry (Abstract, col. 5, lines 1-45).

Krishna et al. does not specifically show the surface roughness being 0.5nm or less. However, Chan et al. shows polishing the surface in order to obtain a surface roughness of 0.5 nm or less (col. 3, lines 55-65, col. 5, lines 10-15).

Since Krishna et al. and Chan et al. are both from the same field of endeavor of preparing surface for bonding, the purpose disclosed by Chan et al. would have been recognized in the pertinent art of Krishna et al.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify Krishna et al. by specifying the surface roughness as taught Chan et al. in order to better reduce the surface roughness.

7. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Krishna et al. (U.S. 5,571,373) and Chan et al. (U.S. 6,057,212 as applied to claim 18 above, and further in view of Fukami et al. (U.S. 5,821,167).

Regarding claim 19, the combination of Krishna et al. and Chan et al. does not specifically show applying a double-sided polishing. However, Fukami et al. teaches

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double-sided polishing a semiconductor wafer as part of the conventional process of preparing the substrate surface (Fig. 1, col. 5, lines 38-60, col. 6, lines 28-35).

Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to modify the combination of Krishna et al. and Chan et al. by including the double-sided polishing as taught Fukami et al. because is part of the conventional polishing process.

Response to Arguments

8. Applicant's arguments filed September 22, 2003 have been fully considered but they are not persuasive. Claims 1-10 and 18-19 stand rejected.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., the multi-crystalline "low-cost" silicon) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In addition, during examination, the claims must be interpreted as broadly as their terms reasonably allow. This means that the words of the claim must be given their plain meaning unless applicant has provided a clear definition in the specification. In re Zletz, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989); MSM Investments Co. v. Carolwood Corp., 259 F.3d 1335, 1339-40, 59 USPQ2d 1856, 1859-60 (Fed. Cir. 2001).

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Applicant argued that Kub et al. does not teach the step of polishing the polycrystalline material. However, polishing the multi-crystalline substrate to reduce surface roughness to less than 10 nm (col. 9, lines 13-15).

In response to applicant's argument that the initial substrate taught by Kub et al. would not be appropriate into Enquist's process, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Regarding claims 4, 6, and 9, Easter et al. is cited as evidence to show that the use of a polycrystalline silicon formed by low pressure CVD is conventional in the art (col. 3, lines 20-33). Therefore, it would have been obvious to a person of ordinary skill in the art at the time of the invention to specify the use polycrystalline silicon in the combination of Enquist and Kub et al. because Enquist suggested that silicon might also be used (Enquist, col. 8, lines 10-15).

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Regarding claims 18-19, it is noted that the features upon which applicant relies (i.e., to achieve smooth surfaces on multi- or poly-crystalline Si) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maria Guerrero whose telephone number is 571-272-1837. The examiner can normally be reached on M-F (8:30-5:00).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on 571-272-1852. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to 571-272-2800.

Maria Guerrero
Maria Guerrero
Primary Examiner
January 12, 2004